

Last updated: 20th September 2002

COMFREY

Family: *Boraginaceae*

Genus: *Symphytum*

Species: *officinale*



Source: <http://home.eduhi.at/teacher/werner/biotop/beinwell.html>

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General Background

In the Middle Ages this plant was a famous remedy for broken bones. The very name Comfrey, is a corruption of *con firma*, in allusion to the uniting of bones it was thought to affect, and the botanical name, *Symphytum*, is derived from the Greek *Symphyo* (to unite). Comfrey is also sometimes referred to as Common comfrey, Knitbone, Boneset, Bruisewort, Germany = Gemeiner Beinewell.

This is a well-known showy plant. Comfrey is perennial, erect in habit, 30 - 120cm high at maturity, and rough and hairy all over. The root is branched, fibrous, fleshy and spindle-shaped, smooth, blackish externally, and internally white.

The leafy stem is stout, angular and hollow, broadly winged at the top and covered with bristly hairs. The lower leaves are very large, up to 25cm long, ovate in shape and covered with rough hairs which can cause itching when touched. Leaves decrease in size the higher they grow up the stem, which is much branched above and terminated by one-sided clusters of drooping flowers. Flowers are either creamy yellow, or purple, growing on short stalks in pairs and are scorpioid in form (resembling the curve of a scorpion's tail). The flowers are all on one side of the stem, gradually tapering from the fully-expanded blossom to the final tiny bud at the extremity of the curve. The fruit consists of four shining nutlets, perforated at the base, and adhering to the receptacle by their base. Comfrey is in bloom throughout the greater part of the summer, the first flowers opening at the end of April or early May.

A native of Europe and temperate Asia, comfrey thrives in almost any soil or situation but does best under the shade of trees. Comfrey is common on the banks of rivers and ditches, in damp places, especially beside rivers and streams and in watery places generally. *S. officinale* with the purplish flower is common in many parts of Europe.

Warning: Comfrey contains potentially dangerous compounds known as pyrrolizidine alkaloids, including heliosupine and cynoglossine which can cause serious liver damage. Concentrations of alkaloids are highest in small, young leaves early in the season and decrease as the leaf grows heavier, and are lowest in the large mature leaves, the roots

also contain high levels of these compounds.

Other related forms such as Russian comfrey (*Symphytum uplandicum*) and prickly comfrey (*Symphytum asperum*) should not be mistaken for regular comfrey as they contain higher levels and/or more toxic types of alkaloids.

In July 2001 the US FDA (Food and Drug Administration) took steps to stop the marketing of comfrey as a dietary supplement.

Details of Quality Characteristics

Constituents:

1. Allantoin, between 0.6 and 0.8%.
2. Pyrrolizidine alkaloids, including echimidine, symphytine, lycopsamine, symplandine. The alkaloids are found in the fresh young leaves and in the root, but in two separate investigations were found to be absent in the dried herb.
3. Phenolic acids; rosmarinic, chlorogenic, caffeic and lithospermic acids.
4. Mucilage, about 29%, composed of a polysaccharide containing glucose & fructose.
5. Miscellaneous; choline, asparagine, volatile oil, tannins, steroidal saponins, triterpenes

The impressive wound-healing properties of Comfrey are partially due to the presence of allantoin. This chemical stimulates cell proliferation and will diffuse readily through tissue, thereby extending its benefits to areas well beyond the point of application, augmenting wound-healing both inside and out. This makes comfrey oil ideal for bruised tendons, soft swellings, old scar tissue, sore muscles, etc. The demulcent mucilage also makes Comfrey a powerful healing agent in gastric and duodenal ulcers, hiatus hernia and ulcerative colitis, diarrhoea and dysentery. The root was traditionally employed for lung troubles and has been used with benefit in cases of bronchitis and irritable cough. Comfrey may be used externally to speed wound-healing and guard against scar tissue developing incorrectly. It may be used for external ulcers, for wounds and fractures as a compress or poultice and is excellent in chronic varicose ulcers. It has a reputed anti-cancer action.

However, while the plant is listed as edible, its safety for internal use in humans is now questioned due to the content of pyrrolizidine alkaloids. The roots of *S. officinale* have been reported to increase the incidence of liver tumors in rats, and other animal studies suggest that it is carcinogenic. The US FDA (Food and Drug Administration) knows of one death. Comfrey has been linked to 4 cases of veno-occlusive disease in the world in the last 20 years, however, these cases all involved long term abuse of comfrey tea. The external use of comfrey is still considered safe apart from on broken skin. Comfrey should not be taken during pregnancy or lactation.

Current Production and Yields

Forage yields of 247 t/ha fresh weight, 22-30 t/ha dry matter have been achieved in the tropics, with heavy fertilisation.

Highest yields in temperate regions are 223 tonnes/ha fresh weight or 15 tonnes dry matter per hectare (3).

Constraints upon Production

Comfrey is easy to grow and once established can become invasive. It may be less suitable to produce in hotter parts of southern Europe due to its preference for shade and damp.

In July 2001 the US FDA took steps to stop the marketing of comfrey as a dietary supplement.

Markets and Market Potential

Comfrey is still used as an ingredient of proprietary medicines for its healing properties and in compresses and liniments.

The young leaves have been used to flavour cakes and other food. Comfrey roots, together

with chicory and dandelion roots, are used to make a well-known herbal 'coffee,' that tastes practically the same as ordinary coffee without any of the caffeine.

The leaves and roots are used to poultice wounds.

A strong decoction has been used on the Continent for tanning leather, and in Angora a sort of glue is got from the common comfrey, which is used for spinning the famous fleeces of that country.

The leaves are also used to make a natural green dye <http://www.erowid.org/herbs/comfrey>

Comfrey is also grown as a green manure.

Other Information

Comfrey is very winter hardy in northern environments and could stabilize soil on erodible lands. Comfrey thrives in almost any soil or situation, but does best under the shade of trees. Seed should be sown outdoors in autumn or springtime into a moist, loose soil. Transplants or cuttings can also be planted. Propagation is either by seed or by division of roots in the autumn: the roots are very brittle, and the least bit of root will start growing afresh. They should be planted about 75 cm apart each way, and will need no further care except to keep them clear from weeds.

As a green crop comfrey yields well, particularly if well-rotted manure is dug between the rows when dressing for winter. As an ornamental plant, comfrey is often introduced into gardens, but it is very difficult to eradicate once it has established itself, a new plant arising from any severed portion of the root.

Collection and Preparation of Roots: The roots should be unearthed in the spring or autumn when the allantoin levels are the highest. Split the roots down the middle and dry in moderate temperatures of about 40-60 degrees C.

Research

Production of a pharmaceutically active secondary compound, allantoin, in tissue cultures of *Symphytum* species.

John Collier and G. Wilson.

Dept. of Botany, University College Dublin, Belfield, Dublin 4.

Plant tissue cultures can be used for the production of commercially valuable secondary metabolites. One plant species, *Symphytum* (Comfrey), has been used traditionally in various types of pharmaceutical preparations and is well known for its anti-inflammatory and impressive wound healing properties. These medicinal properties are due to the presence of allantoin. Through tissue culture it may be possible to produce allantoin (Aln) in vitro, which eventually may be used for the industrial production of allantoin based pharmaceuticals. It is proposed that full nutrient analysis, screening and selection of cell lines and bioreactor studies will be investigated with the aim of producing the highest yield of allantoin in vitro. An in vitro method for the detection of the anti-inflammatory activity of Allantoin will also be developed. Source: <http://www.faqs.org/faqs/medicinal-herbs/part3>

Useful Websites

<http://www.erowid.org/herbs/comfrey> Comfrey.

<http://www.washingtonpost.wysiwyg> Herb Industry Welcomes Curbs on Comfrey. July 2001.

<http://www.botanical.com/botanical/mgmh/c/comfre92.html> Comfrey.

<http://www.faqs.org/faqs/medicinal-herbs/part3> Production of a pharmaceutically active secondary compound, allantoin, in tissue cultures of *Symphytum* species.

<http://www.sun.ars-grin.gov/cgi-bin/duke/ethnobot.pl>

BioMat Net

[Borage \(*Borago officinalis*\) \(related plant\)](#)

Contacts

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8. John Collier and G. Wilson. Production of a pharmaceutically active secondary compound, allantoin, in tissue cultures of *Symphytum* species. Dept. of Botany, University College Dublin, Belfield, Dublin 4. (See abstract above)

